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AREA ANALYSIS OF A PART OF THE UPPER TSANGPO VALLEY

This report analyzes that part of the upper Tsangpo (Brahmaputra) Valley extending west to east from approximately 82°E to 86°E and south to north from the Nepal-Tibet border to the crestlines of the Trans-Himalayan Mountains north of the Tsangpo River.* [redacted]

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A. General Physical Description

The terrain of the upper Tsangpo area can be divided into three major units: (1) the valley and associated river plains of the Tsangpo; (2) the plains and mountains extending south of the Tsangpo Valley to the Nepal border; and (3) the hill and mountain country north of the Tsangpo, generally known as the Trans-Himalayan Mountains.

1. The Tsangpo Valley and Plains

The Tsangpo headwaters rise in high valleys (elevation about 16,000 feet) at approximately 82°30'E. The valleys of the upper Tsangpo source streams are very broad and this tributary characteristic persists as far as Tradum, with the Tsangpo itself spread in numerous channels

* Maps of the ACIC 1:500,000 series, sheets A, B, C, L, and M, cover most of the area discussed in this report.

Approved For Release 2001/11/20 : CIA-RDP79T01019A000100030007-0

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(except during high water) and meandering over a wide, plain-like valley. Great sand dunes and vast accumulations of alluvium are common -- particularly along the stretch of the river near 83°30'E and at the confluence of the Tsangpo and the Tsa Chu (river), immediately south of Tradum. East of Tradum the river, for the most part, is confined to a single channel, the valley becomes narrower (although generally exceeding one-half mile in width), and river depths are greater (see Table, p. 8).

2. Plains and Mountains South of the Tsangpo

South of the Tsangpo the terrain can be divided into two major types. West of Tradum, broad valleys open into the Tsangpo. Through these valleys flow tributaries that have their sources in the high peaks (elevations 20,000 to 21,000 feet) marking the Nepal-Tibet border. Difficult passes higher than 19,000 feet cross the border range.

East of Tradum the terrain is more broken and compartmentalized, with Nepalese streams -- the Buri, Trisuli, and Sun Kosi -- draining considerable territory north of the Nepal-Tibet border. From about 85°E to 86°E, the Tsangpo-Ganges water divide lies in a roughly east-west aligned range that is only 15 to 20 miles south of the Tsangpo. To the south, this range partially encloses a high plain of approximately 15 by 25 miles in which several lakes, including Pekhu Tso, are located. Border passes west of the Gya Pass (84°37'E) are at 18,000 feet and higher; east of the Gya Pass the main transborder routes follow the valleys of rivers that have cut through the high border mountains.

To the south of Tradum is the 22-mile-wide Mustang area -- actually a salient formed by the upper Kali River tributaries that rise north of the main water divide -- that extends the Nepal border to within 20 miles

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of the Tsangpo. Here the water divide is marked by the Kore Pass, a mere rounded knoll at slightly more than 15,000 feet that is located several miles north of the border. North of the Kore Pass a plain about 15,000 feet high opens northward to the Tsangpo.

3. The Trans-Himalayan Mountains

North of the Tsangpo Valley rises a jumbled and complex mass of hills and ridges of the Trans-Himalayan Mountains, whose crests mark the divide between the Tsangpo and the interior drainage basins of the high plateau (Chang Thang) of northern Tibet. The Trans-Himalayan passes leading to the northern plateau are at elevations of about 18,000 feet; they are relatively open and easy, however, with gentle descents to the 15,000-foot to 16,000-foot elevations of the Chang Thang. The complex ridges and spurs marking the southern slopes of the Trans-Himalayan Mountains are cut by numerous streams, some of which flow in part through ravines. The larger valleys, however, are more open and fairly broad, and it is possible to travel through them. In some sections, mainly east of Tradum, these side valleys are used by the major east-west Lhasa to Ladakh caravan route.

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B. Climate

The climate of the upper Tsangpo is characterized by great variability in both temperature and precipitation. Because weather records are lacking, only rough generalizations can be made. In most of the area, freezing temperatures are experienced in all but the warmest summer months. Average winter temperatures are estimated to range from about 20°F in lower valleys in the east to perhaps 5°F to 10°F in the higher valleys of the west. Mean minimum temperatures range downwards from about 15°F to around zero. Extremes may reach -15°F or lower. In the higher areas, temperatures may remain below freezing for three months or so, but in lower and protected areas, temperatures normally will reach a few degrees above freezing on most winter days.

The heaviest precipitation in the area occurs during July and August, primarily as rain although, occasionally, hail storms and flurries of snow may occur even during this season. Total precipitation varies greatly from year to year. Some summers have only occasional showers, but in other years heavy rain storms occur during the summer. Most of the area receives some snow by late October, and along the upper tributaries of the Tsangpo snow may be expected by mid-September. In general, less snow falls north of the Tsangpo Valley than to the south, with the high plateau of Chang Thang receiving only light amounts of extremely dry snow, which evaporates quickly. South of the Tsangpo, however, snowfalls appear to be more frequent, with greater and more lasting accumulations. In the Kubi Valley (about 82°30'E) near the Nepal border at an elevation of about 16,000 feet, snow accumulations of several feet are said to last from November through March. Most of the Tsangpo Valley is at lower elevations, however, and reportedly receives less snow, with little accumulation.

Approved For Release 2001/11/20 : CIA-RDP79T01019A000100030007-0

Approved For Release 2001/11/20 : CIA-RDP79T01019A000100030007-0

Strong westerly winds sweep the open Tsangpo Valley during winter and spring, and the combination of wind, dry snow, and a high evaporation rate normally limits any significant accumulation of snow to lee slopes and depressions. To the east, in the areas of the Jongka Dzong and Pekhu Tso Plain that are largely protected and compartmentalized by surrounding mountains, some snow accumulations have been recorded. Harrer (author of Seven Years in Tibet) reported that heavy snow blocked the exit from Jongka Dzong for approximately a month, from mid-December through mid-January, 1944-45; similarly he found the Pekhu Tso Plain covered by snow in early November. How typical these conditions are is not known, although the general alignment of the terrain features suggests that these areas would accumulate more snow than the wind-swept Tsangpo Valley and adjoining plains. Little is known about the high (18,000 to 19,000 feet) passes along the Nepal-Tibet frontier, but their elevations suggest that they are snowbound during much of the year. Considerable transborder movement takes place throughout most of the year, however, over the much lower routes via the Kore Pass and Mustang area and via the river valley tracks through Kyirong Dzong and Nyalam Dzong. (See discussion of trade routes, p. 8.)

A typical feature of the Tibetan climate is the strong westerly wind that prevails from November through April or May. The wind normally follows a daily rhythm in which strongest velocities are recorded from early afternoon through early evening. The wind has been reported as strong enough to hurl small pebbles before it, and the famed explorer Sven Hedin reported that "even with well-protected eyes it was sometimes impossible to look up" when riding westward against this wind.

Approved For Release 2001/11/20 : CIA-RDP79T01019A000100030007-0

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Tibetan travelers usually plan their journeys to end in early afternoon to avoid these winds. Hazy atmosphere and dust storms are common in the Tsangpo Valley, particularly during the comparatively dry spring months. During the June-through-October period the winds generally are light and are mostly westerlies.

C. Vegetation

Most of the plains and valleys are covered by grass that supports large numbers of sheep, goats, and yaks of the Tibetan nomads. Large herds of wild yaks, antelopes, and kiang (an animal akin to a wild horse) are also found in this area. The nomads normally seek out the higher valley pastures (up to 16,000 feet) during summer and early autumn, retreating to more sheltered lower valleys and plains during winter. Except for the upper Trisuli Valley south of Jongka Dzong, the area is too high to permit the growing of small grains. During summer, some meager dietary supplements such as wild onions, mushrooms, and wild rhubarb may be available in limited quantities.

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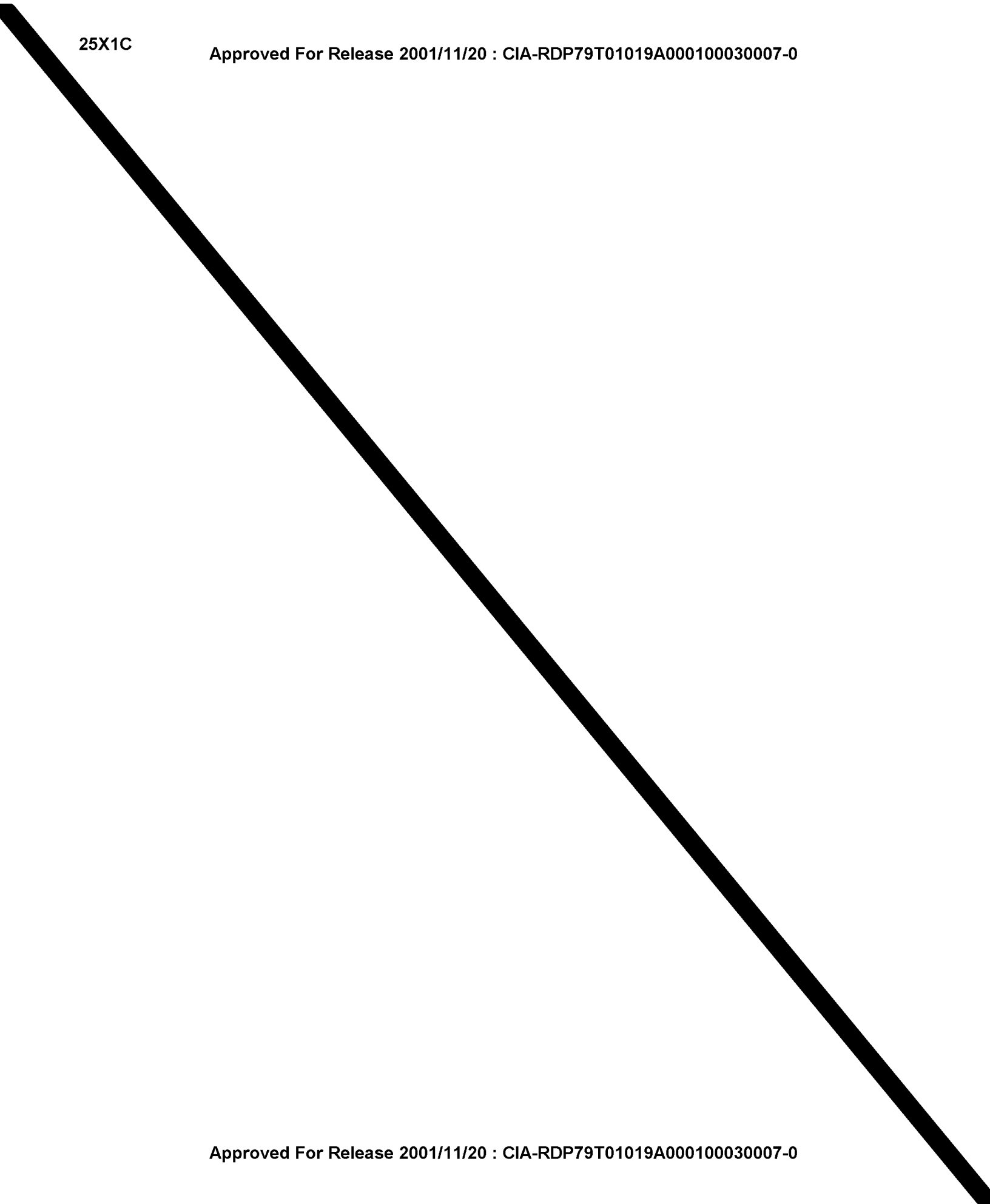

Approved For Release 2001/11/20 : CIA-RDP79T01019A000100030007-0

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Table

Characteristics of the Tsangpo at Selected Points a/

Approximate Location	Width (feet)	Average Depth (feet)
82°55'E, near Shamsang	165	2
83°37'E, near Dongba	3,000 (numerous channels)	1
84°10'E, near Tradum	330	2.5
85°15'E, south of Saka	340 (two branches)	2.25

a. Although these measurements were taken in June and early July when water levels should be approaching their maximum, the particular year (1907) was abnormally dry. Therefore, these figures probably are more nearly representative of the low water conditions that normally should be expected from late October through May.

E. Population Distribution and Trade

The most densely populated part of the general area is the upper Trisuli Valley in the vicinity of Jongka Dzong and Kyirong Dzong. Except for this relatively small area and a few scattered villages located north of the Tsangpo and east of Tradum, the upper Tsangpo Valley is sparsely populated by nomads whose camp sites change with the seasons and the availability of fodder. Probably more nomadic encampments are located north of the Tsangpo than to the south, because the major caravan track is on the north side of the river and because pastures, in the Chang Thang, and sources of salt also are more numerous on this side of the river. Salt is the principal barter item of the nomads and is exchanged for rice from Nepal. The even sparser population of the plains and valleys south of the Tsangpo and west of Mustang probably reflects the

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lack of trade routes south to Nepal and the severance of communications with the north bank of the Tsangpo during much of the summer.

The most important Nepal-Tibet routes are via valleys through Kyirong Dzong and Nyalam Dzong and over the Kore Pass and the Gya Pass. The valley routes are not affected by snow and can be used throughout most of the year, although summer rains in Nepal often halt traffic on the Nepalese side of the border. Autumn appears to be the most favorable season for caravan traffic via the valley routes. Although autumn is also the favored season for trade across the Kore Pass, the pass can be used throughout the year. The Gya Pass, at an elevation of more than 18,000 feet, is a more difficult route; and snow and ice conditions near and on the pass apparently restrict the trading season to a few months during the summer and fall. The other passes along the border are not important as trade routes, but they probably are used occasionally by local people. Since most of them are over 18,000 feet (and some over 19,000 feet), snow and ice conditions undoubtedly will be encountered throughout all but the warmest months. Although these very high passes likely are considered "closed" for 8 or 9 months of the year, small determined parties on foot have been able to cross some of them during the winter.

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